SUPERO®

SUPER P4SAA

USER'S MANUAL

Revision 1.0b

Preface

About This Manual

This manual is written for system integrators, PC technicians and knowledgeable PC users. It provides information for the installation and use of the SUPER P4SAA motherboard. The P4SAA supports single Intel Pentium® 4 processors up to 3.06 GHz at a system bus speed of 533/400 MHz. Pentium 4 processors are housed in a 478-pin microPGA (Plastic Grid Array) package. Please refer to the motherboard specifications pages on our web site (http://www.supermicro.com/Product_page/product-m.htm) for updates on supported processors. This product is intended to be professionally installed.

Manual Organization

Chapter 1 includes a checklist of what should be included in your mainboard box, describes the features, specifications and performance of the P4SSA mainboard and provides detailed information about the chipset.

Chapter 2 begins with instructions on handling static-sensitive devices. Read this chapter when installing the processor and DDR memory modules and when mounting the mainboard in the chassis. Also refer to this chapter to connect the floppy and hard disk drives, the IDE interfaces, the parallel and serial ports, the mouse and keyboard and the twisted wires for the power supply, the reset button, the keylock/power LED and the speaker.

If you encounter any problems, see **Chapter 3**, which describes troubleshooting procedures for the video, the memory and the setup configuration stored in CMOS. For quick reference, a general FAQ (Frequently Asked Questions) section is provided. Instructions are also included for contacting technical support. In addition, you can visit our web site at www.supermicro.com/techsupport.htm for more detailed information.

Chapter 4 includes an introduction to BIOS and provides detailed information on running the CMOS Setup utility.

Appendix A provides BIOS POST Codes.
Appendix B lists BIOS POST Messages.
Appendix C lists BIOS Error Beep Codes.

Table of Contents

Chapter 3: Troubleshooting

Chapter 4: BIOS

Appendices:

Chapter 1
Introduction

1-1   Overview

Checklist

Congratulations on purchasing your computer motherboard from an ac-knowledged leader in the industry. Supermicro boards are designed with the utmost attention to detail to provide you with the highest standards in quality and performance.

Please check that the following items have all been included with your motherboard. If anything listed here is damaged or missing, contact your retailer.

All Included with Retail Box Only

One (1) Supermicro Mainboard

One (1) ATA66/100 ribbon cable for IDE devices

One (1) floppy drive ribbon cable

One (1) CPU retention bracket

One (1) USB 4-port cable (retail only)

One (1) I/O shield

One (1) Supermicro CD or diskettes containing drivers and utilities

One (1) User's/BIOS Manual

Contacting Supermicro

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Technical Support:
Email:	support@supermicro.com.tw
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SUPER P4SAA

Figure 1-1.   SUPER P4SAA Image
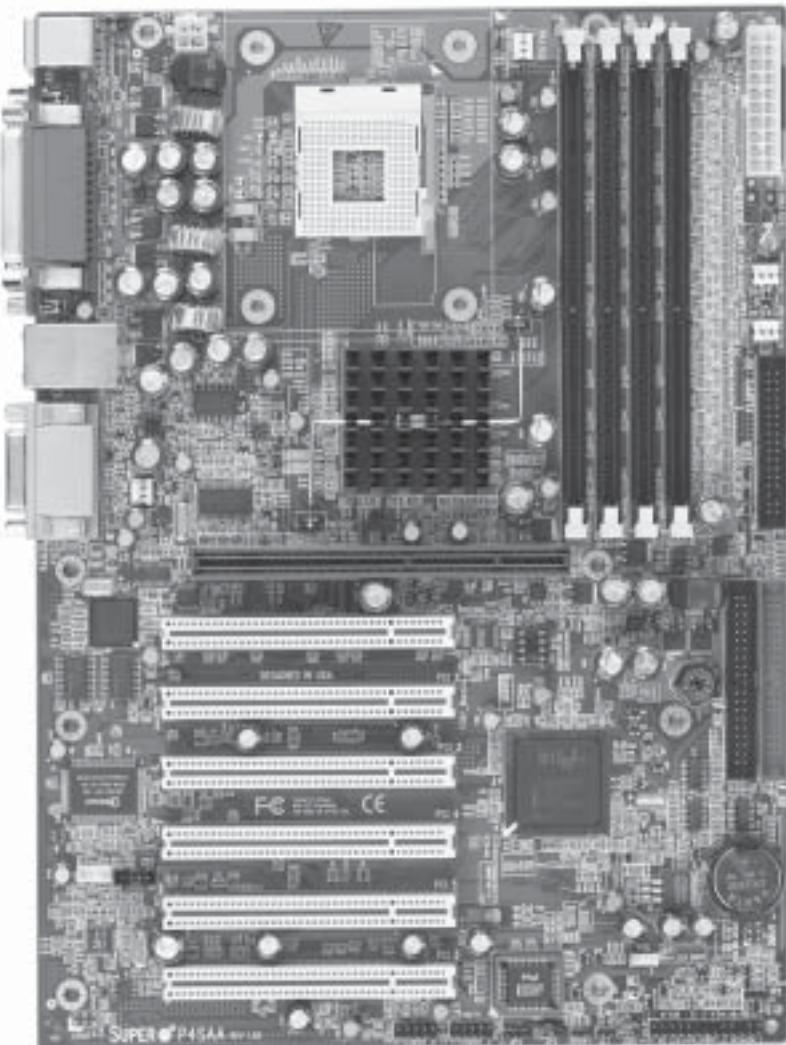
Figure 1-2. Motherboard Layout
(not drawn to scale)
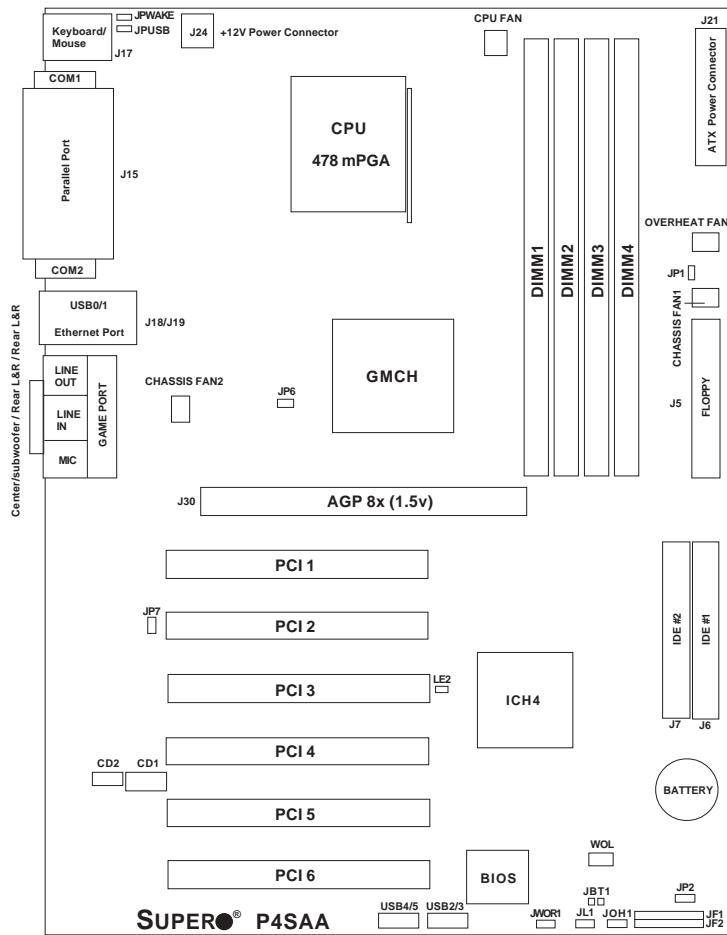
See Chapter 2 for detailed information on jumpers, I/O ports and JF1/JF2 front panel connections.
Jumpers not indicated are for test purposes only.

P4SAA Quick Reference

Jumpers	Description	Default Setting
JBT1	CMOS Clear	See Section 2-7
JP1	Power On	Open (Normal)
JP2	Watch Dog Enable	Pins 2-3 (NMI)
JP6	Front Side Bus Speed	Pins 1-2 (Auto)
JP7	LAN Enable/Disable	Pins 1-2 (Enabled)
JPUSB	USB0/1 Wake Up	Pins 1-2 (Disabled)
JPWAKE	Keyboard Wake-Up	Pins 1-2 (Disabled)

Connectors	Description
CD1	Audio CD Input (large connector)
CD2	Audio CD Input (small connector)
Chassis Fan1/2	Chassis Fan Header
COM1/COM2	COM1/COM2 Serial Port Connector/Header
CPU/Overheat Fan	Processor/Overheat Fan Header
DIMM1/2/3/4	Memory (DIMM) Slots (1 through 4)
Ethernet	Gigabit LAN (Ethernet Port)
Game Port	Game Port
J5	Floppy Disk Drive Connector
J6/J7	IDE #1/#2 Hard Disk Drive Connectors
J15	Parallel Printer Port
J17	PS/2 Keyboard/Mouse
J18/J19	USB 0/1 Ports
J21	ATX 12V Power Connector (20-pin)
J24*	ATX 12V Power Connector (4pin)
J30	8xAGP (1.5V)
JF1, JF2	Front Control Panel
JL1	Chassis Intrusion Header
JOH 1	Overheat LED
JWOR1	Wake-On-Ring Header
LE2	5v Standby Warning LED
LINE IN	Audio In Connector
LINE OUT	Audio Out (Speaker) Connector
MIC	Microphone Input
USB2/USB3	Universal Serial Bus Port 2/3
USB4/USB5	Universal Serial Bus Port 4/5
WOL	Wake-On-LAN

* The 4-pin connector at J24 must be connected to meet the safety requirements of the ATX 12V specifications.
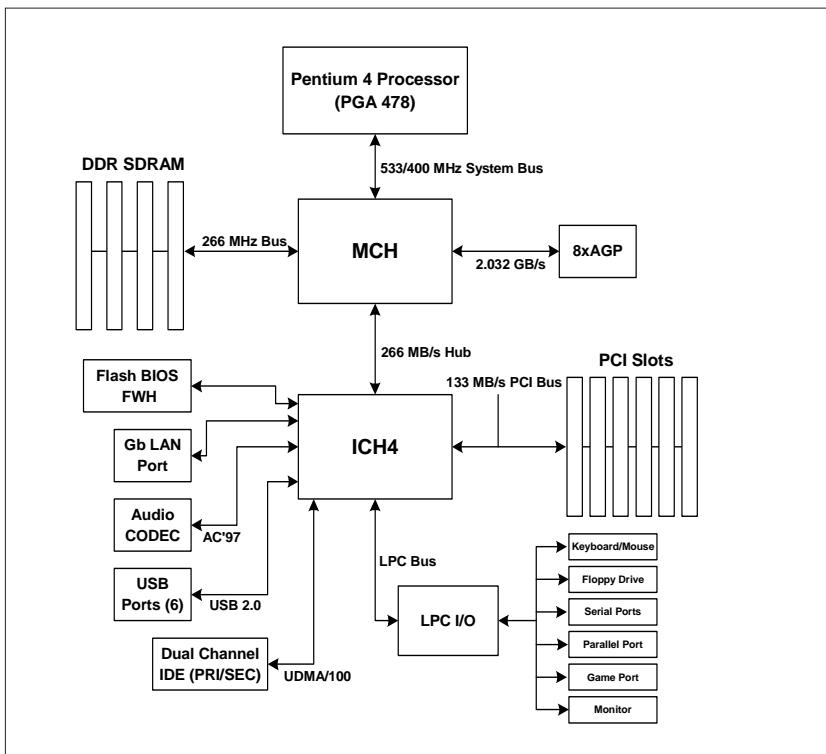
Figure 1-3. E7205 Chipset:
System Block Diagram

Note: This is a general block diagram and may not exactly represent the features on your motherboard. See the following pages for the actual specifications of each motherboard.

Motherboard Features

CPU ◆ *Latest CPU technology!*
- Single Pentium® 4 478-pin mPGA processors to 3.06 GHz (and Intel 478-pin Celeron processors up to 2.2 GHz) at a 533/400 MHz FSB speed

  Note: Refer to the motherboard specifications pages on our web site (http://

  www.supermicro.com/Product_page/product-m.htm) for updates on supported processors.

Memory ◆ *Latest memory technology!*
- Four 184-pin DIMM slots for up to 4 GB of ECC or non-ECC unbuffered DDR-266 or DDR-200 (PC2100 or PC1600) SDRAM

  Note: See Section 2-4 for details.

Chipset ◆ *Latest Intel chipset technology!*
- Intel E7205

Expansion Slots
- Six 32-bit, 33 MHz PCI slots
- One 8xAGP slot (1.5V)

BIOS
- 4 Mb Firmware Hub AwardBIOS® Flash BIOS
- APM 1.2, DMI 2.3, PCI 2.2, ACPI 1.0, Plug and Play (PnP)

PC Health Monitoring
- Nine onboard voltage monitors for CPU core, chipset voltage, +3.3V, +3.3V standby, +5V, +5V standby, Vbat (battery voltage) and ±12V
- Fan status monitor with firmware/software on/off control
- SuperDoctor II Utility
- Environmental temperature monitoring and control
- Power-up mode control for recovery from AC power loss
- System overheat LED and control
- System resource alert
- Hardware BIOS virus protection
- Auto-switching voltage regulator for the CPU core

ACPI Features

- Microsoft OnNow
- Slow blinking LED for suspend state indicator
- BIOS support for USB keyboard
- Real-time clock wake-up alarm
- Main switch override mechanism
- Internal/external modem ring-on

Onboard I/O

- Dual Ultra DMA 100 IDE Bus Masters
- 1 floppy port interface (up to 2.88 MB)
- 2 Fast UART 16550A compatible serial ports
- 1 Gb Ethernet port (Intel K32)
- 1 EPP (Enhanced Parallel Port) and ECP (Extended Capabilities Port) supported parallel port
- PS/2 mouse and PS/2 keyboard ports
- 1 game port with audio ◆ *Latest onboard 6-channel sound technology!*
- Up to 6 USB (Universal Serial Bus) ports ◆ *Latest USB 2.0 technology!*
- 1 infrared port

Other

- Hyper-threading enabled
- Wake-on-LAN (WOL)
- Multiple CPU clock frequency ratio selections (set in BIOS)
- AC97' CODEC
- Suspend-to-RAM
- Onboard +5vsb warning LED ("LE2")

CD Utilities

- BIOS flash upgrade utility
- Drivers and software for E7205 chipset utilities

Dimensions

- ATX form factor, 12" x 8.7" (305 x 221 mm)

1-2   Chipset Overview

Intel's E7205 chipset is comprised of two primary components: the Memory Controller Hub (MCH) and the I/O Controller Hub (ICH4). The E7205 provides the performance and feature-set required for high-end single-processor desktop and workstation systems.

Memory Controller Hub (MCH)

The MCH includes the host (CPU) interface, memory interface, ICH4 interface and 8xAGP interface for the E7205 chipset. It contains advanced power management logic and supports dual channel DDR SDRAM DIMM slots. The AGP 3.0 interface supports 8x data transfers and operates at a peak bandwidth of 2032 MB/s. It supports 8xAGP cards and is backward compatible with 4xAGP cards.

The MCH has four hub interfaces: one to communicate with the ICH4 and three for high-speed I/O communications. The MCH employs a 144-bit wide memory bus for a DDR-266 memory interface, which provides a maximum total bandwidth of 4.27 GB/s. The ICH4 interface is a 266 MB/sec point-to-point connection using an 8-bit wide, 66 MHz base clock at a 4x data transfer rate.

I/O Controller Hub (ICH4)

The ICH4 is a fourth-generation I/O Controller Hub subsystem that integrates many of the input/output functions of the chipset, including a two-channel ATA100 Bus Master IDE controller. The ICH4 also interfaces with the PCI cards, the AC'97 Audio CODEC and the various communications ports. Nearly all communications between the MCH and the ICH4 takes place over the hub Interface, which is a 66 MHz/266 MB/s bus.

Recovery from AC Power Loss

BIOS provides a setting for you to determine how the system will respond when AC power is lost and then restored to the system. You can choose for the system to remain powered off (in which case you must hit the power switch to turn it back on) or for it to automatically return to a power on state. See the Power Lost Control setting in the BIOS chapter of this manual to change this setting. The default setting is Always OFF.

1-3 PC Health Monitoring

This section describes the PC health monitoring features of the SUPER P4SAA. The motherboard has an onboard System Hardware Monitor chip that supports PC health monitoring.

Nine Onboard Voltage Monitors for the CPU Core, Chipset Voltage, +3.3V, +3.3V standby, +5V, +5V standby, Vbat and ±12V

The onboard voltage monitor will scan these voltages continuously. Once a voltage becomes unstable, it will give a warning or send an error message to the screen. Users can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

Fan Status Monitor with Firmware/Software On/Off Control

The PC health monitor can check the RPM status of the cooling fans. The onboard 3-pin fans are controlled by the power management functions.

Environmental Temperature Control

The P4SAA has a CPU "thermal trip" feature. A thermal control sensor monitors the CPU temperature in real time and will send a signal to shut down the system whenever the CPU temperature exceeds a certain threshold. This works to protect the CPU from being damaged by overheating.

CPU Overheat LED and Control

This feature is available when the user enables the CPU overheat warning function in the BIOS. This allows the user to define an overheat temperature. When this temperature is exceeded, the CPU thermal trip feature will activate and shut down the system.

Hardware BIOS Virus Protection

The system BIOS is protected by hardware so that no virus can infect the BIOS area. The user can only change the BIOS content through the flash utility provided by Supermicro. This feature can prevent viruses from infecting the BIOS area and destroying valuable data.

Auto-Switching Voltage Regulator for the CPU Core

The 3-phase-switching voltage regulator for the CPU core can support up to 60A current and auto-sense voltage IDs ranging from 1.1V to 1.85V. This will allow the regulator to run cooler and thus make the system more stable.

1-4 Power Configuration Settings

This section describes features of your motherboard that deal with power and power settings.

Microsoft OnNow

The OnNow design initiative is a comprehensive, system-wide approach to system and device power control. OnNow is a term for a PC that is always on but appears to be off and responds immediately to user or other requests.

Slow Blinking LED for Suspend-State Indicator

When the CPU goes into a suspend state, the chassis power LED will start blinking to indicate that the CPU is in suspend mode. When the user presses any key, the CPU will wake-up and the LED will automatically stop blinking and remain on.

BIOS Support for USB Keyboard

If the USB keyboard is the only keyboard in the system, it keyboard will function like a normal keyboard during system boot-up.

Real Time Clock Wake-Up Alarm

Although the PC may be perceived to be off when not in use, it is still capable of responding to preset wake-up events. In the BIOS, the user can set a timer to wake-up the system at a predetermined time.

Main Switch Override Mechanism

When an ATX power supply is used, the power button can function as a system suspend button. When the user depresses the power button, the system will enter a SoftOff state. The monitor will be suspended and the

hard drive will spin down. Depressing the power button again will cause the whole system to wake-up. During the SoftOff state, the ATX power supply provides power to keep the required circuitry in the system alive. In case the system malfunctions and you want to turn off the power, just depress and hold the power button for 4 seconds. The power will turn off and no power will be provided to the motherboard.

Wake-On-Ring Header

Wake-up events can be triggered by a device such as the external modem ringing when the system is in the SoftOff state. Note that external modem ring-on can only be used with an ATX 2.01 (or above) compliant power supply.

Wake-On-LAN (WOL)

Wake-On-LAN is defined as the ability of a management application to remotely power up a computer that is powered off. Remote PC setup, updates and asset tracking can occur after hours and on weekends so that daily LAN traffic is kept to a minimum and users are not interrupted. The motherboards have a 3-pin header (WOL) to connect to the 3-pin header on a Network Interface Card (NIC) that has WOL capability. Wake-On-LAN must be enabled in BIOS. Note that Wake-On-Lan can only be used with an ATX 2.01 (or above) compliant power supply.

1-5 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for processors that have high CPU clock rates of 1 GHz and faster.

The SUPER P4SAA accommodates 12V ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. You power supply must supply 1 amp of 5V standby voltage.

It is strongly recommended that you use a high quality power supply that meets 12V ATX power supply Specification 1.1 or above. Additionally, in areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

It also provides two high-speed, 16550 compatible serial communication ports (UARTs), one of which supports serial infrared communication. Each UART includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem control capability and a processor interrupt system. Both UARTs provide legacy speed with baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support higher speed modems.

The Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), which includes support of legacy and ACPI power management through a SMI or SCI function pin. It also features auto power management to reduce power consumption.

The IRQs, DMAs and I/O space resources of the Super I/O can be flexibly adjusted to meet ISA PnP requirements, which suppport ACPI and APM (Advanced Power Management).

1-6   Super I/O

The disk drive adapter functions of the Super I/O chip include a floppy disk drive controller that is compatible with industry standard 82077/765, a data separator, write pre-compensation circuitry, decode logic, data rate selection, a clock generator, drive interface control logic and interrupt and DMA logic.   The wide range of functions integrated onto the Super I/O greatly reduces the number of components required for interfacing with floppy disk drives.   The Super I/O supports four 360 K, 720 K, 1.2 M, 1.44 M or 2.88 M disk drives and data transfer rates of 250 Kb/s, 500 Kb/s or 1 Mb/s.

Chapter 2
Installation

2-1   Static-Sensitive Devices

Electric Static Discharge (ESD) can damage electronic components. To prevent damage to your system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

* Use a grounded wrist strap designed to prevent static discharge.
* Touch a grounded metal object before removing the board from the anti-static bag.
* Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
* When handling chips or modules, avoid touching their pins.
* Put the motherboard and peripherals back into their antistatic bags when not in use.
* For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Installation Procedures

Follow the procedures as listed below for full installation of the motherboard into a chassis:

1. Install the processor and the heatsink to the motherboard.

2. Install the motherboard in the chassis.

3. Install the memory and add-on cards.

4. Finally, connect the cables and install the drivers.

2-2   Processor and Heatsink Fan Installation

When handling the   processor package, avoid placing direct pressure on the label area of the fan.

IMPORTANT: Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.

Installation of the Processor and Heatsink

1. Locate the following components, which are included in the shipping package.

Clips (2)

Bracket (1)

Note: The CPU heatsink fan with clips is included only with the retail versions of the P4SAA. If you buy a boxed Intel Pentium 4 478/Northwood processor, it should include a heatsink, fan and retention mechanism. If you buy a processor separately, use only a Supermicro or Intel certified heatsink and fan.

2. Insert the white pegs into the black anchors. Do not force the white pegs all the way in - about 1/3 of the white pegs should be inside the black anchors. (These are for chassis that do not have four CPU retention holes.)

Bracket in position
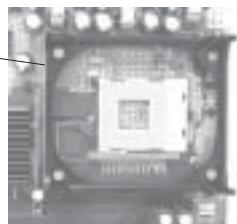
3. Place a retention bracket in the proper position and secure it by pressing two pegs into the retention holes until you hear a *click*. The clicking sound indicates that the peg is locked and secured.

4. Secure the other retention bracket into position by repeating Step 3.

5. Lift the lever on the CPU socket.
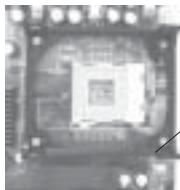
Socket Lever
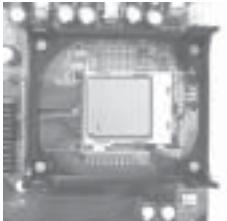
6. Install the CPU in the socket. Make sure that Pin 1 of the CPU is seated on Pin 1 of the socket (both corners are marked with a triangle).

7. Press the lever down until you hear it *click* into the locked position.
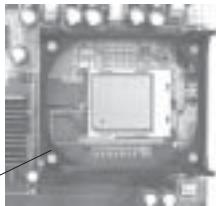
Socket lever in locked position

8. Apply the proper amount of thermal compound to the CPU die.

9. Place the heatsink on top of the CPU and press firmly downward - do not twist or slide the heatsink to seat thermal compound.

10. Secure the heat sink by locking the retention clips into their proper position.
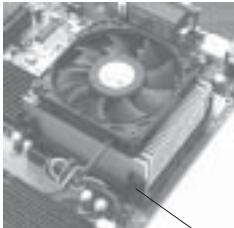
Retainer clip attachment point
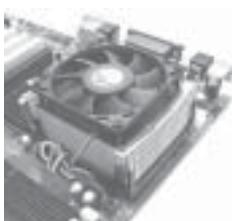
11. Connect the CPU fan cable to the CPU Fan header on the motherboard.

Lever

Pin 1

Pin 1

Processor
(installed)
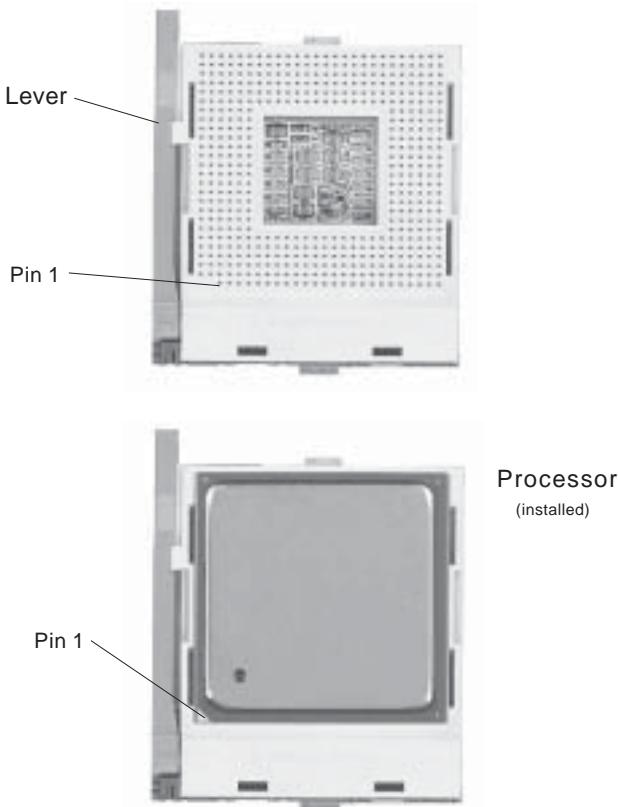
Figure 2-1. 478-pin mPGA Socket: Empty and with Processor Installed

2-3   Mounting the Motherboard in the Chassis

All motherboards have standard mounting holes to fit different types of chassis. Make sure the location of all the mounting holes for both the motherboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the motherboard to the chassis. Make sure the metal standoffs click in or are screwed in tightly. Then use a screwdriver to secure the motherboard onto the motherboard tray.

2-4 Installing DDR Memory

CAUTION

Exercise extreme care when installing or removing memory
modules to prevent any possible damage.

Memory Module Installation (See Figure 2-2)

1. Insert each DDR memory module vertically into its slot. Pay attention to
   the notch along the bottom of the module to prevent inserting the mod-
   ule incorrectly. (See support information below.)
2. Gently press down on the memory module until it snaps into place.

Support

Both double and single-sided ECC/non-ECC, unbuffered DDR-266/200 SDRAM
are supported. Also, both interleaved and non-interleaved operation are sup-
ported. (Inserting two or four modules will enable interleaved operation, while
a single module in DIMM1 will result in non-interleaved operation. Populating
three DIMM slots is not recommended.) When populating two slots, insert the
modules into the DIMM1 and DIMM2 slots. Do not mix memory types and
speeds. DDR-266 is only supported when using a 533 MHz FSB processor.

Figure 2-2. Side and Top Views of DDR Module Installation into Slot

To Install:
Insert module
vertically and
press down
until it snaps
into place.
Pay attention
to the notch.

Notch → | DDR | ← Notch

Release Tab   Release Tab

Note: Notch should align with the receptive point on the slot
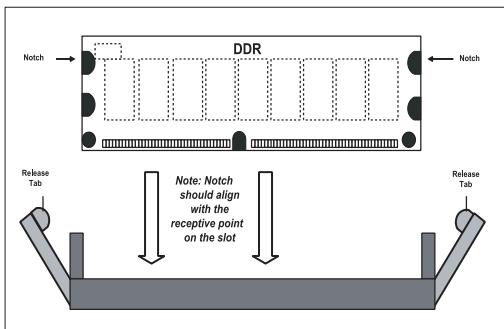
To Remove:
Use your thumbs
gently to push
each release tab
outward to
release the DIMM
from the slot.

Top View of DDR Slot

Release Tab   Release Tab
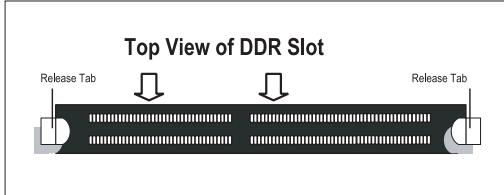
2-5   I/O Port/Control Panel Connector Locations

The I/O ports are color coded in conformance with the PC99 specification to make setting up your system easier. See Figure 2-3 below for the colors and locations of the various IO ports.

Figure 2-3.   I/O Port Locations and Definitions

Mouse (Green)   Parallel Port (Burgundy)   Game Port (Gold)

LAN Port

Keyboard   COM1 Port   COM2 Port   USB 0/1 Ports   Line Out / Line In / Mic

(Purple)   (Turquoise)   (Turquoise)   (Lime) / (Light Blue) / (Pink)
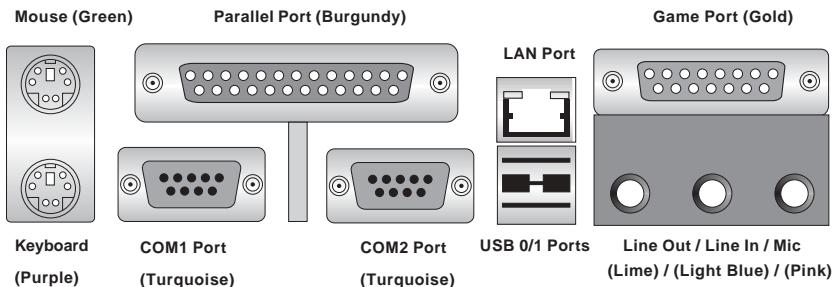
Front Control Panel

JF1 and JF2 contain header pins for various front control panel connectors. See Figure 2-4 for the pin definitions of the various connectors including the speaker. Refer to Section 2-6 for details.

Figure 2-4.   Front Control Panel Connectors

Reset

X

Power On

X

X

X

IR Connector

Speaker

Keylock

Power_LED

IDE LED

1   1
JF1 JF2
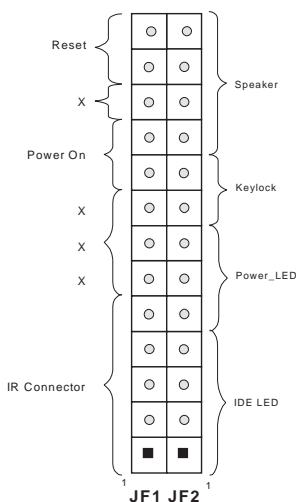
2-6 Connecting Cables

Power Supply Connectors

The primary power supply connector on the P4SAA meets the SSI (Superset ATX) 20-pin specification. Refer to the table on the right for the pin definitions of the ATX 20-pin power connector. You must also connect the 4-pin J24 processor power connector to your power supply. Refer to the table below right for the J24 (12V) connector.

ATX 20-pin Power Connector Pin Definitions (J21)

Pin #	Definition	Pin #	Definition
11	+3.3V	1	+3.3V
12	-12V	2	+3.3V
13	COM	3	COM
14	PS_ON	4	+5V
15	COM	5	COM
16	COM	6	+5V
17	COM	7	COM
18	-5V	8	PW-OK
19	+5V	9	5VSB
20	+5V	10	+12V

+12V 4-pin Connector (J24)

Required Connection

Pins #	Definition
1 & 2	Ground
3 & 4	+12 V

IR Connector

The infrared connector is located on pins 1-5 of JF1. See the table on the right for pin definitions. See the Technical Support section of our web page for information on the infrared devices you can connect to the system.

Infrared Pin Definitions (JF1)

Pin Number	Definition
1	+5V
2	Key
3	IRRX
4	Ground
5	IRTX

PW_ON Connector

The PW_ON connector is located on pins 9 and 10 of JF1. Connect it to the chassis power button, which you may also configure to put the system into suspend mode (see the Power Button Mode setting in BIOS). To turn off the power when the suspend mode is enabled, depress the power button for at least 4 seconds. See the table on the right for pin definitions.

PW_ON Pin Definitions (JF1)

Pin Number	Definition
9	PW_ON
10	Ground

Reset Connector

The reset connector is located on pins 12 and 13 of JF1. This connector attaches to the reset switch on the computer chassis. See the table on the right for pin definitions.

Reset Pin Definitions (JF1)

Pin Number	Definition
12	Ground
13	Reset

IDE LED

The IDE LED is located on pins 1 to 4 of JF2. This connects to the hard drive LED to display hard drive activity. See the table on the right for pin definitions.

IDE LED Pin Definitions (JF2)

Pin Number	Definition
1	+5V
2	HD Active
3	HD Active
4	+5V

Power_LED Connector

The Power LED connector is located on pins 5-7 of JF2. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

Power_LED Pin Definitions (JF2)

Pin Number	Definition
5	+5V
6	Key
7	Control

Keylock Connector

The keylock connector is located on pins 8 and 9 of JF2. See the table on the right for pin definitions.

Keylock Pin Definitions (JF2)

Pin Number	Definition
8	+5V
9	Control

Speaker Connector

The speaker connector is located on pins 10 to 13 of JF2. See the table on the right for pin definitions.

Speaker Pin Definitions (JF2)

Pin Number	Function	Definition
10	+	Red wire, Speaker data
11	Key	No connection
12	Key	No connection
13	-	Speaker data

Serial Ports

Two serial ports are included on the motherboard: COM1 is a port located beside the mouse/keyboard ports and COM2 is a header located on the motherboard near PCI slot 6. See the table on the right for pin definitions.

*NC indicates no connection.

Serial Port Pin Definitions (COM1, COM2)

Pin Number	Definition	Pin Number	Definition
1	CD	6	DSR
2	RD	7	RTS
3	TD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

Note: Pin 10 is included on the header but not on the port.

CD Header

There are two 4-pin CD headers of different sizes on the motherboard. These allow you to use the onboard sound for audio CD playback. Connect the audio cable from your CD drive to the header that fits your cable's connector. Only one CD header can be use at any one time. See the tables at right for pin definitions.

Audio CD Header Pin Definitions (CD1)

Pin Number	Definition
1	Left Stereo Signal
2	Ground
3	Ground
4	Right Stereo Signal

Audio CD Header Pin Definitions (CD2)

Pin Number	Definition
1	Right Stereo Signal
2	Ground
3	Left Stereo Signal
4	Ground

Fan Headers

There are four fan headers on the P4SAA, which are designated CPU Fan, Chassis Fan 1 and 2 and Over Heat Fan. Connect the fan on your CPU heatsink to the CPU Fan header. See the table on the right for pin definitions.

Fan Header Pin Definitions (CPU, Chassis and Overheat)

Pin Number	Definition
1	Ground (black)
2	+12V (red)
3	Tachometer

Caution: These fan headers are DC power.

Chassis Intrusion

The Chassis Intrusion header is designated JL1. See the board layout in Chapter 1 for the location of JL1 and the table on the right for pin definitions.

Chassis Intrusion Pin Definitions (JL1)

Pin Number	Definition
1	Intrusion Input
2	Ground

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located on J17. See the table on the right for pin definitions. (The mouse port is above the keyboard port. See the table on the right for pin definitions.

PS/2 Keyboard and Mouse Port Pin Definitions (J17)

Pin Number	Definition
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

Universal Serial Bus (USB)

Two Universal Serial Bus 2.0 connectors (USB0 and USB1) are provided for backpanel access. See the table on the right (above) for pin definitions. The P4SAA also provides four additional USB 2.0 headers on the motherboard, which may be used to provide front side chassis access (cables not included). These additional ports are labeled USB2, USB3, USB4 and USB5. See the tables on the right (below) for pin definitions.

USB0/USB1 Port Pin Definitions (J18/J19)

Pin#	Definition
1	+5V
2	P0-
3	P0+
4	Ground

USB2/4

Pin Number	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	Key

USB3/5

Pin Number	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	Ground

Wake-On-LAN

The Wake-On-LAN header is designated WOL on the motherboard. See the table on the right for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this function. (You must also have a LAN card with a Wake-On-LAN connector and cable to use this feature.)

Wake-On-LAN Pin Definitions (WOL)

Pin Number	Definition
1	+5V Standby
2	Ground
3	Wake-up

Wake-On-Ring

The Wake-On-Ring header is desig-
nated JWOR. This function allows
your computer to receive and be
"awakened" by an incoming call when
in the suspend state. See the table on
the right for pin definitions. You must
also have a WOR card and cable to
use WOR.

Wake-On-Ring Pin Definitions (JWOR1)

Pin Number	Definition
1	Ground
2	Wake-up

AC'97 Output

AC'97 provides high quality onboard
audio. The P4SAA features 6-chan-
nel sound for front L&R, rear L&R,
center and subwoofer speakers.
This feature is activated with the
Avanc software (on the CD-ROM in-
cluded with your motherboard).
Sound is then output through the Line
In, Line Out and MIC jacks (see at
right). Activate AC 97 with the "AC
97 Audio" setting in the Advanced
Chipset Features section of BIOS.
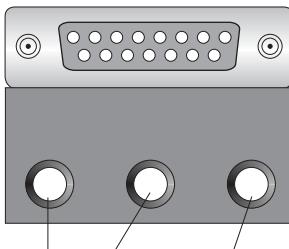
Front L&R / Rear L&R / Center & Subwoofer

2-7 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the motherboard layout pages for jumper locations.
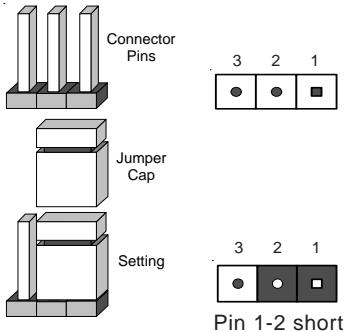
Note: On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.

Connector Pins

Jumper Cap

Setting

3 2 1

3 2 1

Pin 1-2 short

CMOS Clear

JBT1 is not actually a jumper but consists of two contact pads. To clear the contents of CMOS, short these pads together by touching them both with a metal conductor such as the head of a small screwdriver. JBT1 is located near the JL1 header on the P4SAA.
Note: for ATX power supplies, you must completely shut down the system and remove the AC power cord before clearing CMOS.

USB Wake-Up

Use JPUSB to enable or disable USB Wake-Up, which allows you to wakeup the system by de-pressing a key on the keyboard or by clicking the mouse when either is connected to the USB0 or USB1 port. This jumper is used together with the USB Wake-Up function in BIOS. Enable both the jumper and the BIOS setting to allow the system to be woken up. See the table on the right for jumper settings.

USB Wake-Up Jumper Settings (JPUSB)

Jumper Position	Definition
1-2	Disabled
2-3	Enabled

Watch Dog Enable/Disable

JP2 enables controls the Watch Dog function. Watch Dog is a sys-tem monitor that takes action when a software application freezes the system. Pins 1-2 will have WD reset the system if a pro-gram freezes. Pins 2-3 will gener-ate a non-maskable interrupt for the program that has frozen. See the table on the right for jumper settings. <u>Watch Dog must also be enabled in BIOS.</u>

Watch Dog Jumper Settings (JP2)

Jumper Position	Definition
Pins 1-2	WD to Reset
Pins 2-3	WD to NMI
Open	Disabled

Front Side Bus Speed

JP6 is used to set the system (front side) bus speed for the pro-cessors. It is best to keep this jumper set to Auto. This jumper is used together with the CPU Clock setting in BIOS. See the table on the right for jumper settings.

Front Side Bus Speed Jumper Settings (JP6)

Jumper Position	Definition
Pins 1-2	Auto
Pins 2-3	400 MHz
Open	533 Mhz

Keyboard Wake-Up

The JPWAKE jumper is used together with the Keyboard Wake-Up function in BIOS. Enable both the jumper and the BIOS setting to allow the system to be woken up by depressing a key on the keyboard. See the table on the right for jumper settings. Your power supply must meet ATX specification 2.01 or higher and supply 720 mA of standby power to use this feature.

Keyboard Wake-Up Jumper Settings (JPWAKE)

Jumper Position	Definition
1-2	Disabled
2-3	Enabled

LAN Enable/Disable

Change the setting of jumper JP7 to enable or disable the onboard LAN on the motherboard. See the table on the right for jumper settings. The default setting is Enabled.

LAN Enable/Disable Jumper Settings (JP7)

Jumper Position	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Power On

Instead of using the chassis power on switch, you may close jumper JP1 to apply power to the system. See the table on the right for jumper settings. The default setting is Open (normal).

Power On Jumper Settings (JP1)

Jumper Position	Definition
Open	Normal
Closed	Force Power On

2-8   Game Port, Parallel Port, Floppy Drive, Hard Drive and AGP Connections

Use the following information to connect the floppy and hard disk drive cables.

• The floppy disk drive cable has seven twisted wires.

• A red mark on a wire typically designates the location of pin 1.

• A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

• The 80-wire ATA100/66 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this new technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

Game Port Connector

The game port is the gold port on the I/O backplane. Refer to Figure 2-3 for location. See the table on the right for pin definitions.

Game Port Pin Definitions (GAME PORT)

Pin Number	Function	Pin Number	Function
1	+5V fused	2	GP4 (JSBUTO)
3	GP0 (JSX1R)	4	Ground
5	Ground	6	GP1 (JSY1R)
7	GP5 (JSBUT1)	8	+5V fused
9	+5V fused	10	GP6 (JSBUT2)
11	GP2 (JSX2R)	12	MIDI-OUTR
13	GP3 (JSY2R)	14	GP7 (JSBUT3)
15	MIDI-INR		

Parallel Port Connector

The parallel port is located on J15. Refer to Figure 2-3 for location. See the table on the right for pin definitions.

Parallel (Printer) Port Pin Definitions (J15)

Pin Number	Function	Pin Number	Function
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

Floppy Connector

The floppy connector is located on J5. Refer to Figure 2-3 for location. See the table on the right for pin definitions.

Floppy Connector Pin Definitions (J5)			
Pin Number	Function	Pin Number	Function
1	GND	2	FDHDIN
3	GND	4	Reserved
5	Key	6	FDEDIN
7	GND	8	Index-
9	GND	10	Motor Enable
11	GND	12	Drive Select B-
13	GND	14	Drive Select A-
15	GND	16	Motor Enable
17	GND	18	DIR-
19	GND	20	STEP-
21	GND	22	Write Data-
23	GND	24	Write Gate-
25	GND	26	Track 00-
27	GND	28	Write Protect-
29	GND	30	Read Data-
31	GND	32	Side 1 Select-
33	GND	34	Diskette

IDE Connectors

There are no jumpers to configure the onboard IDE interfaces J6 and J7. Refer to Figure 2-3 for location. See the table on the left for pin definitions.

Note: You must use the ATA100/66 cable included with your system to benefit from the ATA100/66 technology.

IDE Connector Pin Definitions (J6, J7)			
Pin Number	Function	Pin Number	Function
1	Reset IDE	2	GND
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	GND	20	Key
21	DRQ3	22	GND
23	I/O Write-	24	GND
25	I/O Read-	26	GND
27	IOCHRDY	28	BALE
29	DACK3-	30	GND
31	IRQ14	32	IOCS16-
33	Addr 1	34	GND
35	Addr 0	36	Addr 2
37	Chip Select 0	38	Chip Select 1-
39	Activity	40	GND

1.5V 8xAGP Slot

The P4SAA includes an 8xAGP slot for high-performance video cards. It is backward compatible with 4xAGP and 2xAGP graphics cards.
To install a VGA card, power down the system and remove the I/O shield corresponding to the AGP slot. Then, pull back the locking tab on the slot before inserting your VGA card. After the card is inserted, close the locking tab if possible (some VGA cards have a notch in the corner of the board to lock it into place, others do not). Replace all chassis covers before restoring power to the system.

Figure 2-5. 8xAGP Slot

Locking Tab
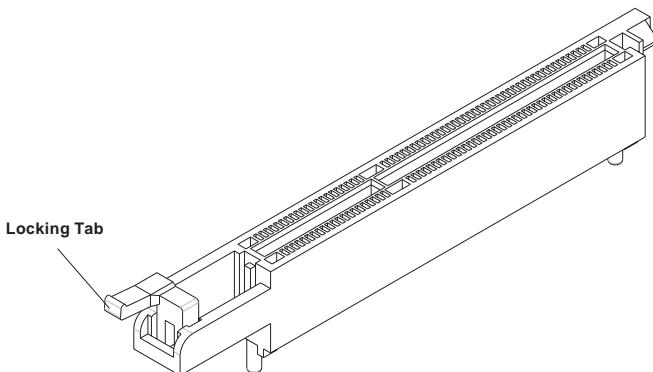
2-9   Installing Software

After all the hardware has been installed, you must first install the operating system, and then the software drivers. The necessary drivers are all included on the Supermicro CD that came packaged with your motherboard. After inserting this CD into your CD-ROM drive, the display shown in Figure 2-5 should appear. (If this display does not appear, click on the My Computer icon and then on the icon representing your CDROM drive. Finally, double click on the S "Setup" icon.)
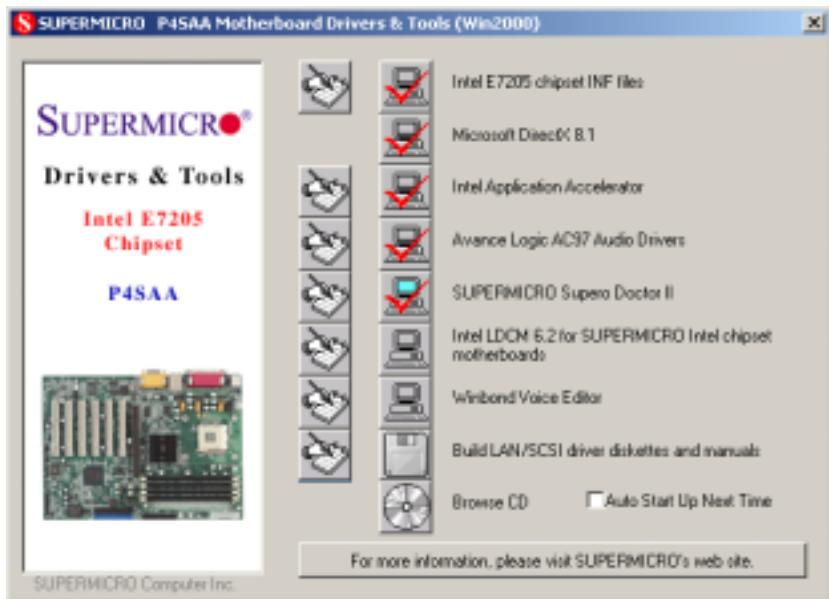
Figure 2-6.   Driver/Tool Installation Display Screen

Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these *in order from top to bottom* to install each item one at a time. **After installing each item, you must reboot the system before moving on to the next item on the list.** You should install everything here except for the SUPER Doctor utility and the LAN/SCSI driver diskettes, which are optional.   The Security and Graphics Drivers support multiple languages. Click the arrows to pull down a menu of choices. The bottom icon with a CD on it allows you to view the entire contents of the CD. **Note:** The memory size reported in the device manager may be less than expected because some is used by the onboard graphics. Higher screen resolutions will take up more of this memory.

SuperO Doctor II

The Super Doctor II program included on the CDROM that came with your motherboard allows you to monitor the environment and operations of your system. Super Doctor II displays crucial system information such as CPU temperature, system voltages and fan status. See Figure 2-7 below for a display of the SuperDoctor interface.

Figure 2-7. SuperDoctor II Interface Display Screen

Notes

Chapter 3
Troubleshooting

3-1   Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the 'Technical Support Procedures' and/or 'Returning Merchandise for Service' section(s) in this chapter. <u>Always disconnect the AC power cord before adding, changing or installing any hardware components</u>.

Before Power On

1. Check that the +5v standby LED is not lit (LE2 on motherboard).
2. Make sure the 4-pin 12v power connector at J24 is connected to your power supply.
3. Make sure no short circuits exist between the motherboard and chassis.
4. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.
5. Remove all add-on cards.
6. Install a CPU and heatsink (making sure it is fully seated) and connect the chassis speaker and the power LED to the motherboard. Check all jumper settings as well.

No Power

1. Make sure no short circuits exist between the motherboard and the chassis.
2. Verify that all jumpers are set to their default positions.
3. Check that the 115V/230V switch on the power supply is properly set.
4. Turn the power switch on and off to test the system.
5. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

No Video

1. If the power is on but you have no video, remove all the add-on cards and cables.
2. Use the speaker to determine if any beep codes exist. Refer to Appendix A for details on beep codes.

NOTE

If you are a system integrator, VAR or OEM, a POST diagnostics card is recommended. For I/O port 80h codes, refer to App. B.

Memory Errors

1. Make sure the DIMM modules are properly and fully installed.
2. You should be using unbuffered DDR memory (see next page). Also, it is recommended that you use the same memory speed for all DIMMs in the system. See Section 2-4 for memory limitations.
3. Check for bad DIMM modules or slots by swapping modules between slots and noting the results.
4. Check the power supply voltage 115V/230V switch.

Losing the System's Setup Configuration

1. Ensure that you are using a high quality power supply. A poor quality power supply may cause the system to lose the CMOS setup information. Refer to Section 1-6 for details on recommended power supplies.
2. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.
3. If the above steps do not fix the Setup Configuration problem, contact your vendor for repairs.

3-2   Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, note that as a motherboard manufacturer, Supermicro does not sell directly to end-users, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problem(s) with the specific system configuration that was sold to you.

1. Please go through the 'Troubleshooting Procedures' and 'Frequently Asked Questions' (FAQs) sections in this chapter or see the FAQs on our web site   (http://www.supermicro.com/techsupport.htm) before contacting Technical Support.
2. BIOS upgrades can be downloaded from our web site at

http://www.supermicro.com/techsupport/download.htm.

Note: Not all BIOS can be flashed depending on the modifications to the boot block code.

3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
   • Motherboard model and PCB revision number
   • BIOS release date/version (this can be seen on the initial display when your system first boots up)
   • System configuration
   An example of a Technical Support form is posted on our web site at http://www.supermicro.com/techsupport/contact_support.htm.
4. Distributors: For immediate assistance, please have your account number ready when contacting our technical support department by e-mail at support@supermicro.com or by fax at (408) 503-8019.

3-3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: The P4SAA supports up to 4 GB of ECC/non-ECC **unbuffered** DDR-266/200 (PC2100/1600) type SDRAM. DDR-266 is only supported when using a 533 MHz FSB processor (using DDR-266 with a 400 MHz FSB processor will result in DDR-200 performance). See Section 2-4 for details on installing memory.

Question: How do I update my BIOS?

Answer: It is recommended that you **not** upgrade your BIOS if you are not experiencing problems with your system. Updated BIOS files are located on our web site at http://www.supermicro.com/techsupport/BIOS/bios.htm. Please check our BIOS warning message and the information on how to update your BIOS on our web site. Also, check the current BIOS revision and make sure it is newer than your current BIOS before downloading. Select your mainboard model and download the BIOS file to your computer. Unzip the BIOS update file and you will find the readme.txt (flash instructions), the awdflash.exe (BIOS flash utility) and the BIOS image (xxxx.bin) files. Copy these files onto a bootable floppy and reboot your system. It is not necessary to set the BIOS boot block protection jumpers on the mainboard. At the DOS prompt upon rebooting, enter the command "awdflash." Then type in the BIOS file that you want to update (xxxx.bin).

Question: After flashing the BIOS my system does not have video. How can I correct this?

Answer: If the system does not have video after flashing your new BIOS, it indicates that the flashing procedure failed. To fix this, first clear CMOS per the instructions in this manual and retry the BIOS flashing procedure. If you still do not have video, please use the following **BIOS Recovery Procedure**. First, make sure the JPWAKE jumper is disabled. Then, turn your system off and place the floppy disk with the saved BIOS image file (see above FAQ) in drive A. Press and hold <Alt> and <F2> at the same time, then turn on the power keeping these keys pressed until your floppy drive starts reading. Your screen will remain blank until the BIOS program is done. If the system reboots correctly, then the recovery was successful. The BIOS Recovery Procedure will not update the boot block in your BIOS.

Question: What's on the CD that came with my motherboard?

Answer: The supplied compact disc has quite a few drivers and programs that will greatly enhance your system. We recommend that you review the CD and install the applications you need. Applications on the CD include chipset drivers for Windows and security and audio drivers.

Question: Why can't I turn off the power using the momentary power on/off switch?

Answer: The instant power off function is controlled in BIOS by the Power Button Mode setting. When the On/Off feature is enabled, the motherboard will have instant off capabilities as long as the BIOS has control of the system. When the Standby or Suspend feature is enabled or when the BIOS is not in control such as during memory count (the first screen that appears when the system is turned on), the momentary on/off switch must be held for more than four seconds to shut down the system. This feature is required to implement the ACPI features on the motherboard.

Question: How do I utilize the six-channel sound?

Answer: The six-channel sound available on the P4SAA can be enabled with the audio driver software that was included in your motherboard package. When activated, sound will be routed through the jacks under the Game Port as follows: Line Out = front L&R speakers, Line In = rear L&R speakers, MIC = center and subwoofer speakers. You must also enable the "AC97 Audio" setting in the Advanced Chipset section of the BIOS setup.

Question: I see some of my PCI devices sharing IRQs, but the system seems to be fine. Is this correct or not?

Answer: Some PCI Bus Mastering devices can share IRQs without performance penalties. These devices are designed to work correctly while sharing IRQs. See Table 3-1, below, for details on shared IRQs.

Table 3-1. P4SAA IRQs

PCI 1 shares an IRQ with AC97 and the System Management bus
PCI 2 shares an IRQ with a USB 2.0 controller (USB4 & USB5)*
PCI 3 shares an IRQ with a USB 2.0 controller (USB2 & USB3)*
PCI 4 has a dedicated IRQ (does not share)
PCI 5 has a dedicated IRQ (does not share)
PCI 6 shares an IRQ with the USB 2.0 controller (USB0 - USB5)

*Assumes USB 2.0 drivers have not been installed.

Question: I installed my microphone correctly but I can't record any sound.   What should I do?

Answer: Go to <Start>, <Programs>, <Accessories>, <Entertainment> and then <Volume Control>. Under the Properties tab, scroll down the list of devices in the menu and check the box beside "Microphone".

Question: How do I connect the ATA100/66 cable to my IDE device(s)?

Answer: The 80-wire/40-pin high-density ATA100/66 IDE cable that came with your system has two connectors to support two drives. This special cable must be used to take advantage of the speed the ATA100/66 technology offers. **Connect the blue connector to the onboard IDE header and the other connector(s) to your hard drive(s).** Consult the documentation that came with your disk drive for details on actual jumper locations and settings.

3-4 Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alteration, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

Chapter 4
BIOS

4-1   Introduction

This chapter describes the AwardBIOS for the P4SAA. The Award ROM BIOS is stored in a Flash chip and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Refer to the Manual Download area of our web site for any changes to BIOS that are not reflected in this manual.

System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The AwardBIOS Flash chip stores the system parameters, such as amount of memory, type of disk drives and video displays, etc. CMOS requires very little power. When the computer is turned off, a back-up battery provides power to the BIOS Flash chip, enabling it to retain the system parameters. Each time the computer is powered-on, the computer is then configured with the values stored in the BIOS ROM by the system BIOS, which gains control when the computer is powered on.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Chipset and Power menus. Section 4-3 gives detailed descriptions of each parameter setting in the Setup utility.

4-2   Running Setup

Optimal default settings are in bold text unless otherwise noted.

The BIOS setup options described in this section are selected by choosing the appropriate text from the Main BIOS Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (see on next page).

When you first power on the computer, the AwardBIOS™ is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1.   By pressing <Del> immediately after turning the system on, or
2.   When the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test), press the <Del> key to activate the Main Setup Menu.

Press DEL to enter SETUP

4-3   Main BIOS Setup

All Main Setup options are described in this section. The Main BIOS Setup screeen is displayed below.

Use the <Up> <Down> arrow keys or the <Tab> key to move among the different settings in the above menu.

Press the <Esc> key to exit theCMOS Setup Menu and use the <Left> <Right> arrow keys to enter the the other categories of BIOS settings. The next section is described in detail to illustrate how to navigate through the menus.

Main BIOS Setup Menu
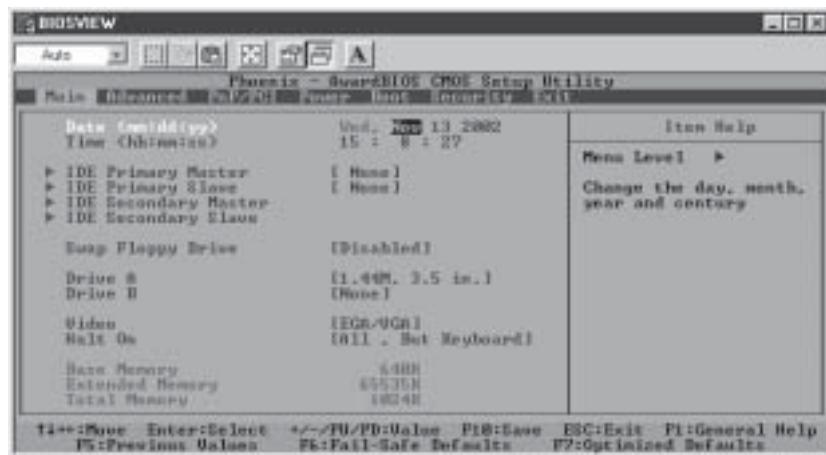
Date/Time

Set the system date and time. Key in the correct information in the "mm", "dd" and "yy" fields. Press the "Enter" key to save the data.

IDE Primary Master/IDE Primary Slave/IDE Secondary Master/IDE Secondary Slave

These options allow the user to set the parameters of the IDE Primary Master/Slave and IDE Secondary Master/Slave slots. Press "Enter" to activate the following sub-menu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the sub-menu are listed below:

IDE HDD Auto-Detection

Press the <Enter> key to activate the "IDE HDD Auto-Detection" function, which will allow BIOS to automatically detect the status of the IDE HDD installed in the system, such as the size and number of cylinders.
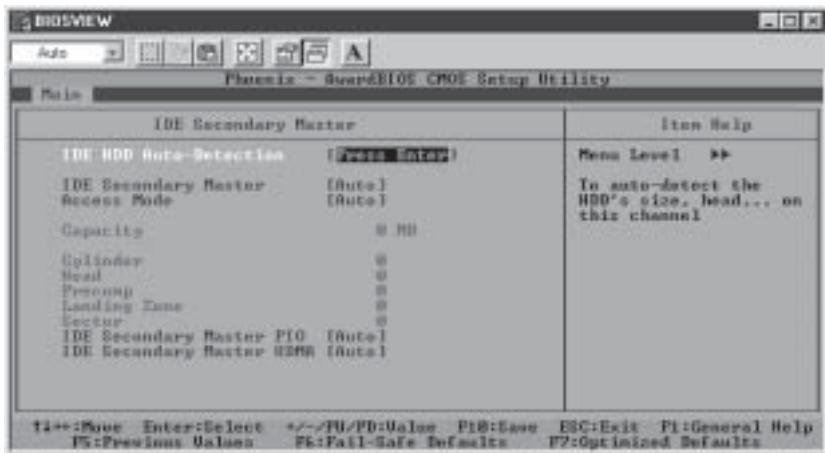
IDE Primary Master

This option allows the user to determine the manner in which the AwardBIOS sets the settings for the IDE Primary Master Device. The options are "None", "**Auto**" and "Manual."

Access Mode

This item determines the location through which the AwardBIOS accesses the IDE Primary Master Device. The settings are "CHS", "LBA", "Large", and "**Auto**".

IDE Primary Slave PIO

See the previous setting for description. The options for this setting are "**Auto**", "Mode 0", "Mode 1", "Mode 2", "Mode 3" and "Mode 4".

IDE Primary Master UDMA

This is available only when your IDE drive supports UDMA and the operating environment also includes a UDMA drive. If your IDE hard drive and your system software both support UDMA, select Auto to enabled BIOS support. The options for this setting are "**Auto**" and "Disabled".

Swap Floppy Drive

This setting allows the user to swap the designation (A and B) of the floppy disk drives installed in the system (if there are two floppy disk drives installed on the mainboard). The options are "**Disabled**" and "Enabled".

Drive A/Drive B

These settings allow the user to set the type of floppy disk drive(s) installed in the system. The options are "None", "360K, 5.25 in", "1.2M, 5.25 in", "720K, 3.5 in", "1.44M, 3.5 in" and "2.88M, 3.5 in". Default settings are "1.44, 3.5" in for Drive A and "None" for Drive B.

Video

Use this setting to specify the type of display you are using with the system. Options are "**EGA/VGA**", "CGA 40", "CGA 80" and "MONO".

Halt On

If the system encounters a non-specified error during boot-up, it will come to a halt as directed by these settings. You can tell the system to halt on "All Errors", "No Errors", "**All, But Keyboard**", "All, But Diskette" or "All, But Disk/Key".

Base Memory/Extended Memory/Total Memory

These are displays that inform you how much of each type of memory is recognized as being present in the system.

4-4   Advanced BIOS Setup

Choose Advanced BIOS Setup from the Award BIOS main menu with the Left/
Right arrow keys.   You should see the following display. Select one of the
items in the left frame of the screen to go to the sub screen for that item.
Advanced BIOS Setup options are displayed by highlighting the option using the
arrow keys. All Advanced BIOS Setup options are described in this section.
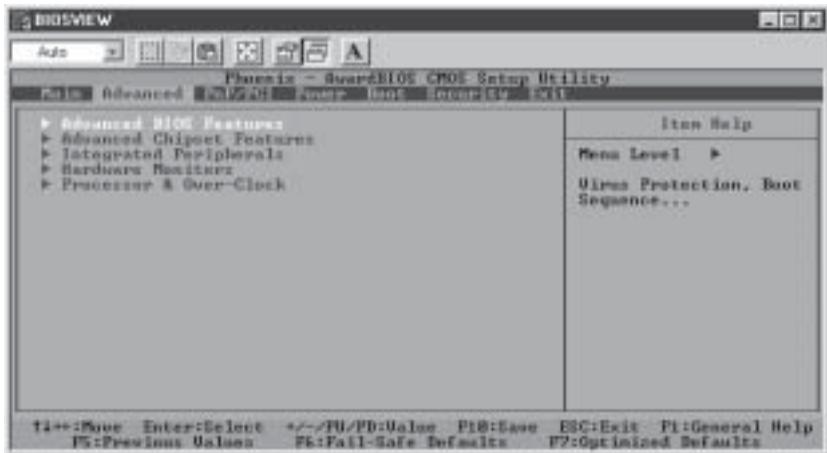
4-4.1   Advanced BIOS Features

When the item of Advanced BIOS Features is highlighted, press the <Enter>
key to activate the screen below:
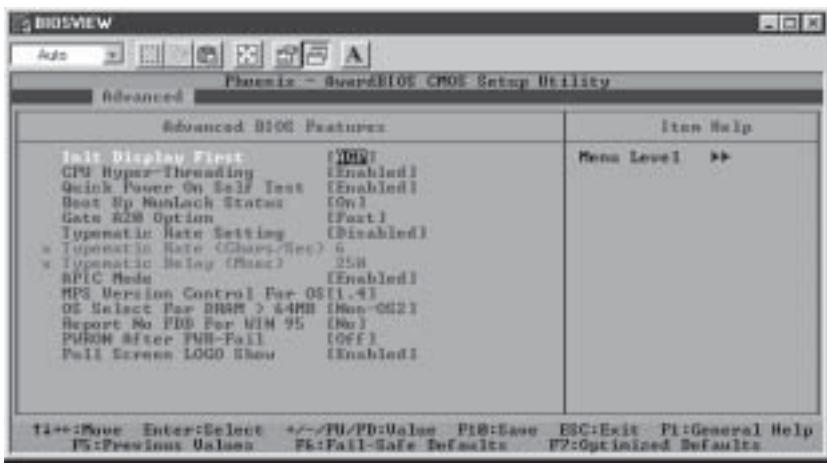
Init Display First

This setting allows the user to determine which device will be first displayed when the sytem boots up - a device installed in the PCI slot or a device intalled in the AGP slot. The options are "PCI slot" and "**Onboard/AGP**".

CPU Hyper-Threading

Use this setting to enable hyper-threading on your processor, which allows it to perform like a dual processor system. The settings are "**Enabled**" and "Disabled".

Quick Power-On Self Test

If enabled, this feature will speed up the POST (Power On Self Test) routine after the computer is switched on. The settings are "**Enabled**" and "Disabled". If "Disabled", the POST will run at normal speed.

Boot Up NumLock Status

This option enables the system to check the status of the NumLock key during boot-up. The settings are "**On**" and "Off".

Gate A20 Option

This option allows the user to determine if the chipset or the keyboard controller should have the control over Gate A20. The settings are "Normal" or "**Fast**".   If set to "Normal", a pin in the keyboard controller controls Gate A20. If "Fast" is selected, the chipset will have the control over Gate A20.

Typematic Rate Setting

If enabled, the option allows the user to set the number of times a key stroke repeats itself in a second when the key is held down. If disabled, the keyboard controller sets the rate.

Typematic Rate (Chars/Sec)

You may change this setting only if the Typmatic Rate Setting is enabled. This setting allows the user to set the number of times a

key stroke repeats itself in a second when the key is held down. The options are: "**6**", "8", "10", "12", "15", "20", "24" and "30."

Typematic Delay

You may change this setting only if the Typmatic Rate Setting is enabled. This setting sets the delay time after a key is held down before it begins to repeat the keystroke. The settings are: "**250**", "500", "750" and "1000."

APIC Mode

This setting allows you to **Enable** or Disable APIC. APIC is used to assign interrupt signals to a specific processor on multi-processor system and provides IRQs beyond the conventional 16 under Windows 2000 or XP. It has no effect on single processor systems.

MPS Version Control for OS

This setting allows you to state the MPS version for your operating system. Options are "1.1" and "**1.4**".

OS Select For DRAM > 64MB

This setting should be changed only if using OS2 and your system has more than 64 MB of RAM. The options are "OS2" and "**Non-OS2**".

Report No FDD for WIN 98

This setting can be used to not report the FDD when running in Windows 98. The options are "Yes" and "**No**".

PWRON After PWR-Fail

This setting allows the user to specify how the system will respond when power is reapplied after the system has gone down due to a power failure. The options are "**Off**", "On" and "Former-Sts".

Full Screen Logo Show

The options for this setting are "Enabled" and "**Disabled**". This refers to the logo that appears when your computer boots up.

4-4.2   Advanced Chipset Features

This section covers the functions used for configuring the system based upon the special features offered by the chipset. The chipset manages the operations of major components of the board. Normally, the default settings for the Advanced Chipset Features listed in the section are pre-configured by the manufacturer for the optimal performance of the system. It is recommended that the user does not alter the default settings. This section is provided as an emergency measure for the user to restore the functions of the system when the critical data stored in the BIOS is lost.
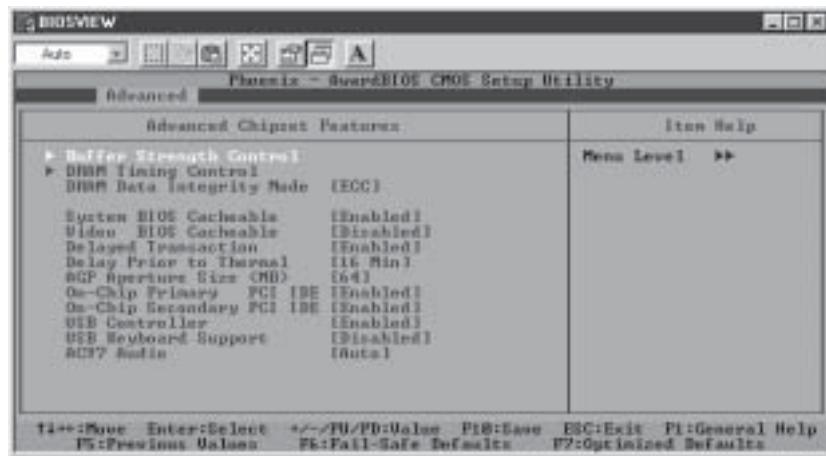
Buffer Strength Control

Highlighting this item and pressing <Enter> will display a submenu that allows you to control various buffer strengths.

DRAM Timing Control

Highlighting this item and pressing <Enter> will display a submenu that allows you to control various DRAM timing parameters.

DRAM Data Integrity Mode

This item allows you to set a method for finding data errors. The options are "**ECC**" and "non-ECC".

System BIOS Cacheable

If enabled, the system BIOS information stored in the BIOS ROM (Read Only Memory) chip will be written and temporarily stored in the "cacheable" memory section of the CPU, giving the CPU faster access to the information. The options are "Disabled" and "**Enabled**".

Video BIOS Cacheable

If enabled, the information regarding the Video BIOS stored in the BIOS ROM (Read Only Memory) chip will be written and temporarily stored in the "cacheable" memory section of the CPU, giving the CPU faster access to the information. The options are "**Disabled**" and "Enabled".

Delayed Transaction

This setting compensates for the slower speed of ISA cards on a PCI interface and so is only relevant if ISA cards are present on the motherboard. The options are "**Enabled**" and "Disabled".

Delay Prior to Thermal

The options for this setting are "4 Min", "8 Min", "**16 Min**" and "32 Min".

AGP Aperture size (MB)

This setting allows the user to set the aperture size for the Accelerated Graphics Port (AGP). The options are "4", "8", "16", "32", "**64**", "128" and "256" (MB).

On-Chip Primary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately. The options for this setting are "**Enabled**" and "Disabled".

On-Chip Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately. The options for this setting are "**Enabled**" and "Disabled".

USB Controller

You should Enable this setting if your system contains a Universal Serial Bus (USB) controller (it does) and you have USB peripherals. The options for this setting are "**Enabled**" and "Disabled".

USB Keyboard Support

If enabled, this setting allows the user to activate the BIOS support of the On-Chip USB Keyboard Controller. The options are "**Disabled**" and "Enabled".

AC 97 Audio

This setting allows the user to activate BIOS support for AC'97 audio. The options for this setting are "**Auto**" and "Disabled".

4-4.3 Integrated Peripherals

When the item "Integrated Peripherals" is highlighted, press the <Enter> key to activate the following sub-menu screen.
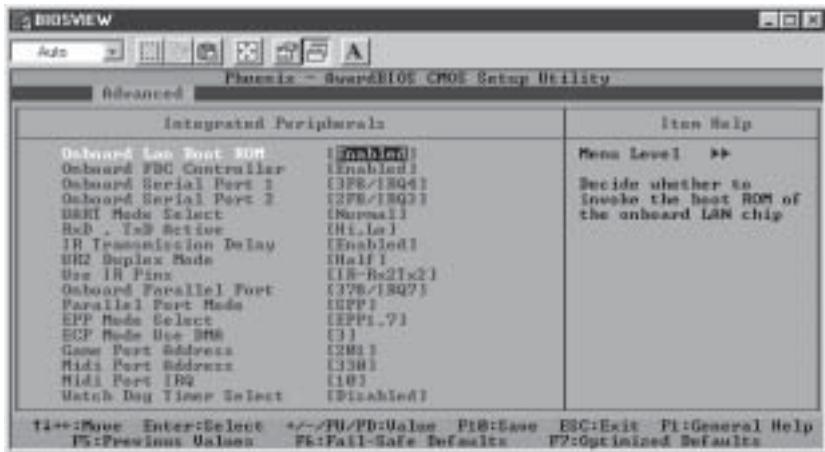
Onboard LAN Boot ROM

This setting allows you to decide whether to Enable invoking the boot ROM of the onboard chip for LAN 1/2. The settings are "**Enabled**" and "Disabled".

Onboard FDC Controller

Select "Enabled", if your system has a floppy disk controller (FDC) installed on the main board and you wish to use it. The settings are "**Enabled**" and "Disabled".

Onboard Serial Port 1/Port 2

This setting allows the user to set the address and the corresponding IRQ for the Serial Port1 and Serial Port 2.   The options are "Disabled" , "3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/IRQ3", and "Auto". The default setting for Serial Port1 is "**3F8/IRQ4**" and the default for Port 2 is is "**2F8/IRQ3**".

UART Mode Select

This setting allows the user to select the UART mode for BIOS. The options are "IrDA", "ASKIR" and "**Normal**".

RxD, TxD Active

This allows the user to change the settings for the "RxD, TxD Active" function. The options are "Hi, Hi", "**Hi, Lo**", "Lo, Hi", and "Lo, Lo".

IR Transmission Delay

If "Enabled", the transmssion of IR (infrared) signals will be delayed. The options are "**Enabled**" and "Disabled".

UR2 Duplex Mode

This setting set the mode for the UR2 Duplex Mode. The options are "Full" and "**Half**".

Use IR Pins

This item sets the usage of the IR pins. The options are "RxD2, TxD2" and "**IR-Rx2Tx2**".

Onboard Parallel Port

This setting allows the user to set the address and the corresponding IRQ for the onboard parallel port. The options are "Disabled", "**378/IRQ7**", "278/IRQ5" and "3BC/IRQ7".

Parallel Port Mode

This setting sets the mode for the onboard Parallel port. The options are "SPP," "EPP", "**ECP**" "ECP+EPP" and "Normal".

EPP Mode Select

This setting allows the user to select the EPP port type. The options are

"EPP 1.9" and "**EPP 1.7**".

ECP Mode Use DMA

This setting allows the user to select the DMA channel for the ECP mode (port) to use. The options are "1" and "**3**".

Game Port Address

This setting allows the user to set the Game Port address. The options are "Disabled", "**201**" and "209."

Midi Port Address

This setting allows the user to set the Midi Port address. The options are "Disabled", "**330**", "300" and "290".

Midi Port IRQ

This setting allows the user to set the Midi Port IRQ.   The options are "5" and "**10**".

Watch Dog Feature

This setting allows you to Enable or Disable the Watch Dog feature. You must also change the setting of the Watch Dog jumper to enable this function (see jumper settings in Chapter 2). Options are "Enabled" and "**Disabled**".

4-4.4   Hardware Monitors

When the item "Hardware Monitors" is highlighted, press the <Enter> key to activate the following sub-menu screen.
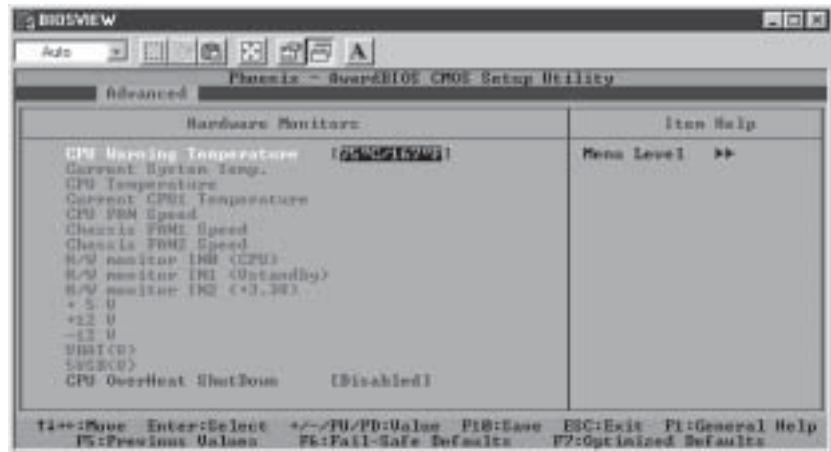
There are only two settings on this menu (below). The rest of this menu shows various temperatures and voltage levels as indicated.

CPU Warning Temperature

This allows you to set the CPU warning temperature. If the CPU temperature reaches this threshold, an alarm will activate and a warning message will be displayed onscreen. The options are "Disabled", "60^0C/140^0F", "65^0C/149^0F", "70^0C/158^0F", "**75^0C/167^0F**" and "80^0C/176^0F".

CPU Overheat Shutdown

This setting gives you the option of having the system shutdown in the event of an overheat condition. The options are "**Disabled**" and Enabled".

4-4.5   Processor & Over-Clock

When the item "Processor Features" is highlighted, hit the <Enter> key to activate the sub-menu shown below:
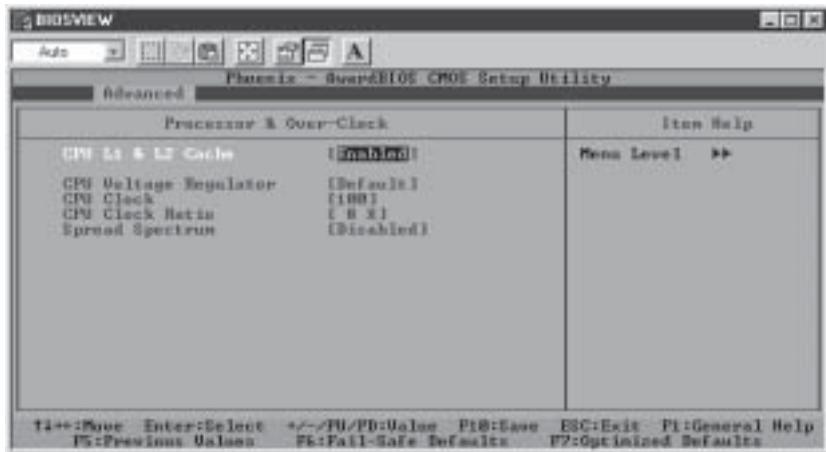
CPU L1 & L2 Cache

Set this option to "Enable" to activate the function of CPU L1 and L2 cache. The settings are "Disabled" and "**Enabled**".

CPU Voltage Regulator

If you overclock your CPU, it may be necessary to increase the voltage supplied to the CPU. This setting allows you to do this. The options are "-0.050V", "-0.025V", "**Default**", "+0.025V", "+0.050V" "+0.100V", "+0.150V" and "0.200V". Supermicro does not recommend or make any guarantees with CPU overclocking.

CPU Clock

Key in a number between 100 and 165 to set the CPU clock (MHz). Supermicro does not recommend or make any guarantees with CPU overclocking.

CPU Clock Ratio

This item allows the user to change the CPU/Clock ratio. Key in any whole number between (and including) 8 and 50. The default setting is **8x**".

Spread Spectrum

Spread Spectrum is a technique used to stabilize operation when a system is being affected by electromagnetic interference. The options for this setting are +/- 0.25%", "- 0.5%", "+/- 0.5%", "+/- 0.38%" and "**Disabled**".

4-5   PCI/PnP Configurations

Choose PCI/PnP Configurations from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:
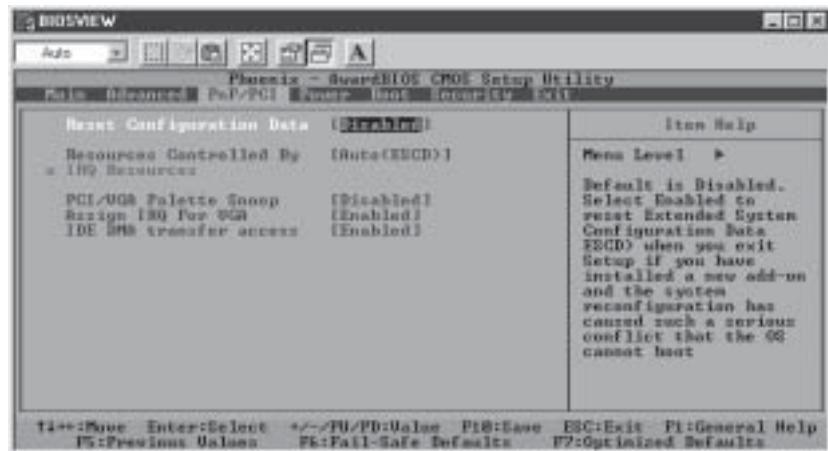
Reset Configuration Data

Enabling this setting resets the extended system configuration data when you exit setup. Do this when you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot reboot the system. The options are "Enabled" and "**Disabled**".

Resources Controlled By

This setting allows BIOS to automatically configure all boot and Plug and Play compatible devices. If you choose Auto, you cannot select the IRQ, DMA and memory base address fields, because BIOS automatically assigns them. The options are "**Auto <ESCD>**" and "Manual".

PCI/VGA Palette Snoop

For best system performance, this item has been pre-set to "Disabled" by the manufacturer. The settings are "Enabled" and "**Disabled**".

Assign IRQ for VGA

This setting allows you to assign an IRQ (Interrupt Request) for the VGA. The settings are **"Enabled"** and "Disabled".

IDE DMA Transfer Access

This setting is to allow access to UDMA when running in DOS mode. The settings are "**Enabled**" and "Disabled".

4-6   Power

Choose Power from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:
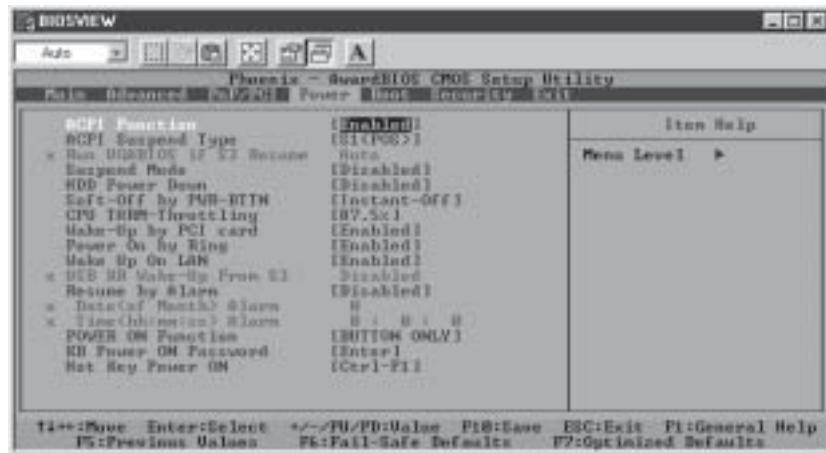
ACPI Function

This item allows you to enable and disable the ACPI (Advanced Configuration and Power Management) program. The options are "**Enabled**" and "Disabled".

ACPI Suspend Type

This item allows the user to determine the ACPI Suspend type. The options are "**S1 (POS)**", "S3 (STR)" and "S1&S3". The "S1&S3" setting should be used only with Windows XP operating systems.

Run VGABIOS if S3 Resume

This item will only be changeable if the ACPI Suspend Type (above) is set to S3. Enabling this will initiate the VGA BIOS for the S3 mode. Options are "**Auto**", "Yes" and "No".

Suspend Mode

This item sets the period of time that passes before the system goes into suspend mode. The options are "**Disabled**", "1min", "2min", "4min", "8min", "12min", "20min", "30min", "40min" and "1hr".

HDD Power Down

This item sets the period of time that passes before the hard drive(s) is powered down. The options are "**Disabled**", "1min", "2min", "3min", "4min", "5min", "6min", "7min", "8min", "9min", "10min", "11min", "12min" "13min", "14min" and "15min".

Soft-Off by PWR-BTTN

This item determines the system's "Soft-off" mode when the user presses the power-button. The options for this setting are "**Instant-Off**" and "Delay 4 sec".

CPU THRM-Throttling

THRM throttling is used to lower power consumption and reduce the heat gererated by the CPU. The options for this setting are "**87.5%**", "75%", "62.5%', "50%", "37.5%", "25%' and "12.5%'.

Wake-Up by PCI Card

If Enabled, the user is able to "wake up" the system via a PCI card. The settings are "**Enabled**" and "Disabled".

Power On by Ring

If Enabled, the user is able to "wake up" the system via the modem. The options for this setting are "**Enabled**" and "Disabled".

Wake Up on LAN

If Enabled, the user is able to "wake up" the system via the LAN. The options for this setting are "**Enabled**" and "Disabled".

USB KB Wake Up From S3

This item is only changeable if the ACPI Suspend Type (above) is set to S3. Enabling this will allow you to wake-up the system by depressing a button on a USB-connected keyboard. Options are "Enabled" and "**Disabled**".

Resume by Alarm

If Enabled, this setting will allow the AwardBIOS to turn on the system via the real-time clock (RTC). The options are "Enabled" and "**Disabled**".

Date (of Month) Alarm

Set the date for RTC alarm wake up in this field.

Time (hh:mm:ss) Alarm

Set the time for RTC alarm wake up in this field.

POWER ON Function

This setting allows the user to determine the method by which the system power is activated. The options are "Password", "Hot Key", "Mouse Left", "Mouse Right", "Any Key", "**Button Only**" and "Keyboard 98".

KB Power On Password

This setting allows the user to set the password to activate the Power On function through the keyboard. Press <Enter> to enter the password.

Hot Key Power On

This option allows the user to set the hot key to activate the power on function. The settings are "**Ctrl F1**", "Ctrl F2", "Ctrl F3", "Ctrl F4", "Ctrl F5", "Ctrl F6", "Ctrl F7", "Ctrl F8", "Ctrl F9", "Ctrl F10", "Ctrl F11" and "Ctrl F12".

4-7   Boot

Choose Boot from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:
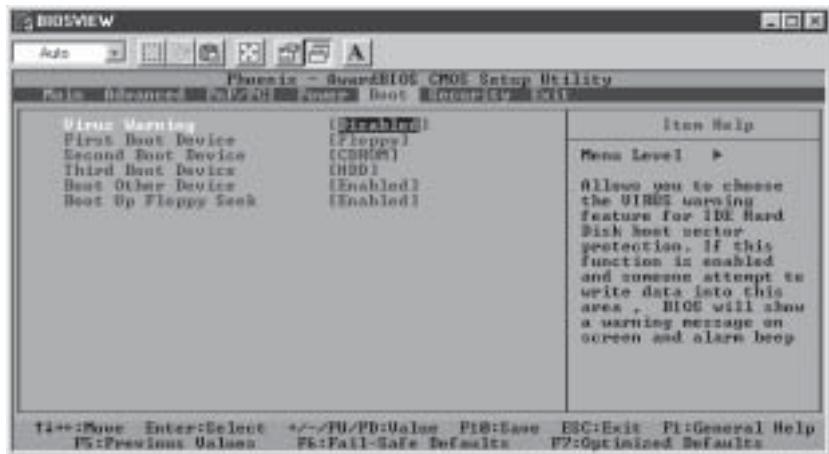
Award BIOS attempts to load the operating system from devices specified by the users in a user-specified sequence.

Virus Warning

This item allows the user to choose the VIRUS Warning feature for IDE Hard Drive Disk boot sector protection. If this function is enabled and someone attempts to write data into this area, the BIOS will display a warning message and an alarm will sound. The settings are "Enabled", and "**Disabled**".

First Boot Device

This item allows the user to set the first boot-up device. The options are "**Floppy**", "LS120", "HDD", "SCSI", "CDROM", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Second Boot Device

This item allows the user to set the second boot-up device. The options are "Floppy", "LS120", "HDD", "SCSI", "**CDROM**", "ZIP100", "USB-FDD",

"USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Third Boot Device

This item allows the user to set the third boot-up device. The options are "Floppy", "LS120", "**HDD**", "SCSI", "CDROM", "ZIP100", "USB-FDD", "USB-ZIP", "USB-CDROM", "USB-HDD", "LAN" and "Disabled".

Boot Other Device

If enabled, this option enables the BIOS to load the OS from another device rather than the ones that have been specified as the first, second and third boot up devices. The settings are "**Enabled**" and "Disabled".

Boot Up Floppy Seek

Set this option to "Enabled" to allow the BIOS to test floppy drives to determine whether they have 40 tracks or 80 tracks. The settings are "**Enabled**" or "Disabled".

4-8 Security

Choose Security from the Award BIOS main menu with the Left/Right arrow keys. You should see the following display:
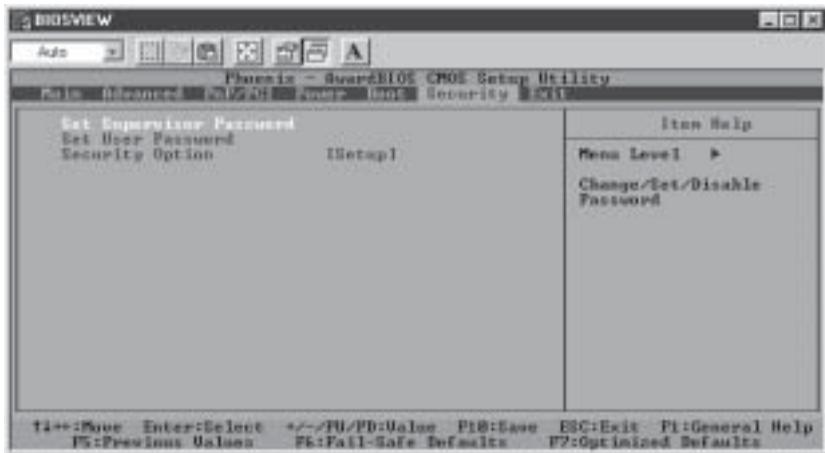
Set Supervisor Password

When the item "Set Supervisor Password" is highlighted on the above screen, press the <Enter> key. When prompted, type the Supervisor Password in the dialogue box to set or to change the Supervisor Password.

Set User Password

When the item "Set User Password" is highlighted on the above screen, press the <Enter> key. When prompted, type the User Password in the dialogue box to set or to change the User Password.

Security Option

This setting allows the user to determine if the password is required every time when the system boots up or if the password is required only when you enter the CMOS setup. The options are "System" and "**Setup**".

4-9   Exit

Choose Exit from the Award BIOS main menu with the Left/Right arrow
keys.   You should see the following display:
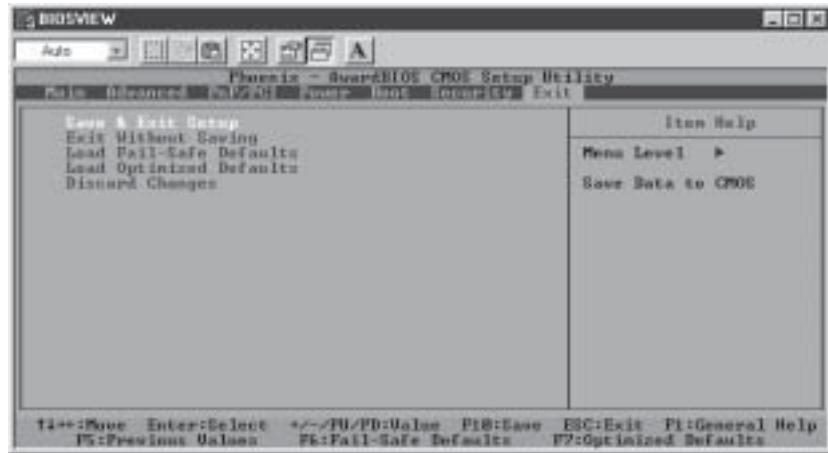
Save & Exit Setup

When the item "Save & Exit Setup" is highlighted, press <Enter> to save the
changes you've made in the BIOS program (CMOS) and exit.   Your system
should, then, continue with the boot-up procedure.

Exit without Saving

When the item "Exit without Saving" is highlighted, press <Enter> to exit the
Setup routine without saving any changes you may have made.   Your sys-
tem should then continue with the boot-up procedure.

Load Fail-Safe Defaults

Highlight this item and hit <Enter> to load the default settings for all items in
the BIOS Setup.   These are the safest settings to use.

Load Optimized Defaults

Highlight this item and hit <Enter> to load the optimized settings for all items
in the BIOS Setup.   These settings provide you with optimal system
performance.

Discard Changes

When the item "Discard Changes" is highlighted, press <Enter> to discard any changes you made to the BIOS settings and to stay in BIOS Setup. Your system should then continue with the boot-up procedure.

Appendix A
BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for problems. If a problem is found, the BIOS will activate an alarm or display a message. The following is a list of such BIOS messages.

Failure Fixed Disk
Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup. Find out if the fixed-disk type is correctly identified.

Stuck key
Stuck key on keyboard.

Keyboard error
Keyboard not working.

Keyboard Controller Failed
Keyboard controller failed test. May require replacing keyboard controller.

Keyboard locked - Unlock key switch
Unlock the system to proceed.

Monitor type does not match CMOS - Run SETUP
Monitor type not correctly identified in Setup

Shadow Ram Failed at offset: nnnn
Shadow RAM failed at offset **nnnn** of the 64k block at which the error was detected.

System RAM Failed at offset: nnnn
System RAM failed at offset **nnnn** of in the 64k block at which the error was detected.

Extended RAM Failed at offset: nnnn Extended memory not working or not configured properly at offset **nnnn.**

System battery is dead - Replace and run SETUP
The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

System CMOS checksum bad - Default configuration used

System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.

System timer error

The timer test failed. Requires repair of system board.

Real time clock error

Real-Time Clock fails BIOS hardware test. May require board repair.

Check date and time settings

BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

Previous boot incomplete - Default configuration used

Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of **wait states**, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the waitstate configuration is correct. This error is cleared the next time the system is booted.

Memory Size found by POST differed from CMOS

Memory size found by POST differed from CMOS.

Diskette drive A error
Diskette drive B error

Drive A: or B: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.

Incorrect Drive A type - run SETUP

Type of floppy drive A: not correctly identified in Setup.

Incorrect Drive B type - run SETUP

Type of floppy drive B: not correctly identified in Setup.

System cache error - Cache disabled
RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.

CPU ID:
CPU socket number for Multi-Processor error.

EISA CMOS not writeable
ServerBIOS2 test error: Cannot write to EISA CMOS.

DMA Test Failed
ServerBIOS2 test error: Cannot write to extended **DMA** (Direct Memory Access) registers.

Software NMI Failed
ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).

Fail-Safe Timer NMI Failed
ServerBIOS2 test error: Fail-Safe Timer takes too long.

device Address Conflict
Address conflict for specified **device.**

Allocation Error for: device
Run ISA or EISA Configuration Utility to resolve resource conflict for the specified **device**.

CD ROM Drive
CD ROM Drive identified.

Entering SETUP ...
Starting Setup program

Failing Bits: nnnn
The hex number **nnnn** is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.

Fixed Disk n
Fixed disk **n** (0-3) identified.

Invalid System Configuration Data
Problem with NVRAM (CMOS) data.

I/O device IRQ conflict
I/O device IRQ conflict error.

PS/2 Mouse Boot Summary Screen:
PS/2 Mouse installed.

nnnn kB Extended RAM Passed
Where **nnnn** is the amount of RAM in kilobytes successfully tested.

nnnn Cache SRAM Passed
Where **nnnn** is the amount of system cache in kilobytes successfully tested.

nnnn kB Shadow RAM Passed
Where **nnnn** is the amount of shadow RAM in kilobytes successfully
tested.

nnnn kB System RAM Passed
Where **nnnn** is the amount of system RAM in kilobytes successfully tested.

**One or more I2O Block Storage Devices were excluded from the Setup
Boot Menu**
There was not enough room in the IPL table to display all installed I2O block-
storage devices.

Operating system not found
Operating system cannot be located on either drive A: or drive C:. Enter Setup
and see if fixed disk and drive A: are properly identified.

Parity Check 1 nnnn
Parity error found in the system bus. BIOS attempts to locate the address and
display it on the screen. If it cannot locate the address, it displays **????.** Parity is
a method for checking errors in binary data. A parity error indicates that some
data has been corrupted.

Parity Check 2 nnnn

Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????.**

Press <F1> to resume, <F2> to Setup, <F3> for previous

Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an **Option ROM**, i.e., an add-on card). Write down and follow the information shown on the screen.

Press <F2> to enter Setup

Optional message displayed during POST. Can be turned off in Setup.

PS/2 Mouse:

PS/2 mouse identified.

Run the I2O Configuration Utility

One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).

System BIOS shadowed

System BIOS copied to shadow RAM.

UMB upper limit segment address: *nnnn*

Displays the address *nnnn* of the upper limit of **Upper Memory Blocks**, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.

Video BIOS shadowed

Video BIOS successfully copied to shadow RAM.

Notes

Appendix B
BIOS POST Codes

This section lists the POST (Power On Self Test) codes for the PhoenixBIOS. POST codes are divided into two categories: recoverable and terminal.

Recoverable POST Errors

When a recoverable type of error occurs during POST, the BIOS will display an POST code that describes the problem. BIOS may also issue one of the following beep codes:

> 1 long and two short beeps - video configuration error
> 1 continuous long beep - no memory detected

Terminal POST Errors

If a terminal type of error occurs, BIOS will shut down the system. Before doing so, BIOS will write the error to port 80h, attempt to initialize video and write the error in the top left corner of the screen.

The following is a list of codes that may be written to port 80h.

POST Code	Description
02h	Verify Real Mode
03h	Disable Non-Maskable Interrupt (NMI)
04h	Get CPU type
06h	Initialize system hardware
07h	Disable shadow and execute code from the ROM.
08h	Initialize chipset with initial POST values
09h	Set IN POST flag
0Ah	Initialize CPU registers
0Bh	Enable CPU cache
0Ch	Initialize caches to initial POST values
0Eh	Initialize I/O component
0Fh	Initialize the local bus IDE
10h	Initialize Power Management
11h	Load alternate registers with initial POST values
12h	Restore CPU control word during warm boot
13h	Initialize PCI Bus Mastering devices
14h	Initialize keyboard controller
16h	1-2-2-3 BIOS ROM checksum
17h	Initialize cache before memory Auto size

POST Code	Description
18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
20h	1-3-1-1 Test DRAM refresh
22h	1-3-1-3 Test 8742 Keyboard Controller
24h	Set ES segment register to 4 GB
28h	Auto size DRAM
29h	Initialize POST Memory Manager
2Ah	Clear 512 kB base RAM
2Ch	1-3-4-1 RAM failure on address line *xxxx**
2Eh	1-3-4-3 RAM failure on data bits *xxxx** of low byte of memory bus
2Fh	Enable cache before system BIOS shadow
32h	Test CPU bus-clock frequency
33h	Initialize Phoenix Dispatch Manager
36h	Warm start shut down
38h	Shadow system BIOS ROM
3Ah	Auto size cache
3Ch	Advanced configuration of chipset registers
3Dh	Load alternate registers with CMOS values
41h	Initialize extended memory for RomPilot
42h	Initialize interrupt vectors
45h	POST device initialization
46h	2-1-2-3 Check ROM copyright notice
47h	Initialize I20 support
48h	Check video configuration against CMOS
49h	Initialize PCI bus and devices
4Ah	Initialize all video adapters in system
4Bh	QuietBoot start (optional)
4Ch	Shadow video BIOS ROM
4Eh	Display BIOS copyright notice
4Fh	Initialize MultiBoot
50h	Display CPU type and speed
51h	Initialize EISA board
52h	Test keyboard
54h	Set key click if enabled
55h	Enable USB devices
58h	2-2-3-1 Test for unexpected interrupts
59h	Initialize POST display service
5Ah	Display prompt "Press F2 to enter SETUP"
5Bh	Disable CPU cache

POST Code	Description
5Ch	Test RAM between 512 and 640 kB
60h	Test extended memory
62h	Test extended memory address lines
64h	Jump to UserPatch1
66h	Configure advanced cache registers
67h	Initialize Multi Processor APIC
68h	Enable external and CPU caches
69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size
6Bh	Load custom defaults (optional)
6Ch	Display shadow-area message
6Eh	Display possible high address for UMB recovery
70h	Display error messages
72h	Check for configuration errors
76h	Check for keyboard errors
7Ch	Set up hardware interrupt vectors
7Dh	Initialize Intelligent System Monitoring
7Eh	Initialize coprocessor if present
80h	Disable onboard Super I/O ports and IRQs
81h	Late POST device initialization
82h	Detect and install external RS232 ports
83h	Configure non-MCD IDE controllers
84h	Detect and install external parallel ports
85h	Initialize PC-compatible PnP ISA devices
86h	Re-initialize onboard I/O ports.
87h	Configure Motherboard Configurable Devices (optional)
88h	Initialize BIOS Data Area
89h	Enable Non-Maskable Interrupts (NMIs)
8Ah	Initialize Extended BIOS Data Area
8Bh	Test and initialize PS/2 mouse
8Ch	Initialize floppy controller
8Fh	Determine number of ATA drives (optional)
90h	Initialize hard-disk controllers
91h	Initialize local-bus hard-disk controllers
92h	Jump to UserPatch2
93h	Build MPTABLE for multi-processor boards
95h	Install CD ROM for boot
96h	Clear huge ES segment register
97h	Fix up Multi Processor table
98h	1-2 Search for option ROMs. One long, two short beeps on checksum failure

POST Code	Description
99h	Check for SMART Drive (optional)
9Ah	Shadow option ROMs
9Ch	Set up Power Management
9Dh	Initialize security engine (optional)
9Eh	Enable hardware interrupts
9Fh	Determine number of ATA and SCSI drives
A0h	Set time of day
A2h	Check key lock
A4h	Initialize typematic rate
A8h	Erase F2 prompt
AAh	Scan for F2 key stroke
ACh	Enter SETUP
AEh	Clear Boot flag
B0h	Check for errors
B1h	Inform RomPilot about the end of POST.
B2h	POST done - prepare to boot operating system
B4h	1 One short beep before boot
B5h	Terminate QuietBoot (optional)
B6h	Check password (optional)
B7h	Initialize ACPI BIOS
B9h	Prepare Boot
BAh	Initialize SMBIOS
BBh	Initialize PnP Option ROMs
BCh	Clear parity checkers
BDh	Display MultiBoot menu
BEh	Clear screen (optional)
BFh	Check virus and backup reminders
C0h	Try to boot with INT 19
C1h	Initialize POST Error Manager (PEM)
C2h	Initialize error logging
C3h	Initialize error display function
C4h	Initialize system error handler
C5h	PnPnd dual CMOS (optional)
C6h	Initialize note dock (optional)
C7h	Initialize note dock late
C8h	Force check (optional)
C9h	Extended checksum (optional)
CAh	Redirect Int 15h to enable remote keyboard
CBh	Redirect Int 13h to Memory Technologies Devices such as ROM, RAM, PCMCIA, and serial disk
CCh	Redirect Int 10h to enable remote serial video

POST Code	Description
CDh	Re-map I/O and memory for PCMCIA
CEh	Initialize digitizer and display message
D2h	Unknown interrupt

The following are for boot block in Flash ROM

POST Code	Description
E0h	Initialize the chipset
E1h	Initialize the bridge
E2h	Initialize the CPU
E3h	Initialize system timer
E4h	Initialize system I/O
E5h	Check force recovery boot
E6h	Checksum BIOS ROM
E7h	Go to BIOS
E8h	Set Huge Segment
E9h	Initialize Multi Processor
EAh	Initialize OEM special code
EBh	Initialize PIC and DMA
ECh	Initialize Memory type
EDh	Initialize Memory size
EEh	Shadow Boot Block
EFh	System memory test
F0h	Initialize interrupt vectors
F1h	Initialize Run Time Clock
F2h	Initialize video
F3h	Initialize System Management Manager
F4h	Output one beep
F5h	Clear Huge Segment
F6h	Boot to Mini DOS
F7h	Boot to Full DOS

* If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (*xxxx*) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the loworder byte of the error. It repeats this sequence continuously.

Notes